

Process Specification for Electrodeposited Chromium Plating

Engineering Directorate

Structural Engineering Division

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Process Specification for Electrodeposited Chromium Plating

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REVISIONS		
VERSION	CHANGES	DATE
--	Original version	5/96
A	Formatting; mandates 23 hour hydrogen bakeout for steel alloys.	7/26/99
B	Changed EM references to ES	9/2002
C	Updated specification reference to AMS-QQ-C-320	10/2004

Verify correct version before use.

1.0 **SCOPE**

This process specification establishes technical requirements for the application of electrodeposited chromium plating on steel, copper and copper alloys, and zinc and zinc alloys.

2.0 **APPLICABILITY**

This process specification applies to the electrodeposition of chromium plating on substrates of steel, copper, zinc, and their alloys.

3.0 **USAGE**

This process specification shall be called out on the engineering drawing by using a drawing note that identifies the process specification, the class, and the type. For example:

CHROMIUM PLATE PER NASA/JSC PRC 5003, CLASS 1, TYPE II.

The two classes of electrodeposited chromium plating are:

Class 1 Corrosion protective chromium plating (>0.00001 in. thick)

Class 2 Engineering chromium plating (>0.002 in. thick)

Class 1 plating is used to protect iron, copper, or zinc alloys against corrosive attack in rural, industrial, or marine environments, which varies depending on the thickness of the chromium deposit. It may also be used as an undercoat for a chromium plating or for aesthetic purposes.

Class 2 plating is used primarily for wear resistance, abrasion resistance, and incidental corrosion protection. Heavy deposits of Class 2 plating, such as those produced by the Watts bath process, may be used for build-up of worn or undersized parts.

Class 1 chromium plating shall be one of the following types, as-specified on the engineering drawing:

Type I – Bright Finish

Type II – Satin Finish

3.1 WORK INSTRUCTIONS

Work instructions shall be generated for implementing this process specification. The work instructions shall contain sufficient detail to ensure that the manufacturing process produces consistent, repeatable products that comply with this specification.

4.0 REFERENCES

The following references were used in developing this process specification:

SOP-007.1 *Preparation and Revision of Process Specifications*

JSC 8500C *Engineering Drawing System Requirements*

The following document is called out as an extension of the requirements given in this specification:

AMS-QQ-C-320 *Aerospace Material Specification/Chromium Plating
(Electrodeposited)*

5.0 MATERIALS REQUIREMENTS

The materials used shall meet the requirements of AMS-QQ-C-320.

6.0 PROCESS REQUIREMENTS

All electrodeposited chromium plating shall be applied according to the technical requirements of AMS-QQ-C-320 with the following exception:

All steel parts which have a hardness of Rockwell C40 and higher shall be subjected to a hydrogen bakeout procedure immediately following plating. Within 4 hours of the chromium electrodeposition, the plated parts shall be “baked out” at a minimum temperature of 375 +/- 25°F for a duration of 23 hours or longer to provide hydrogen embrittlement relief.

7.0 PROCESS QUALIFICATION

Not required.

8.0 PROCESS VERIFICATION

The process verification shall include visual examination, adhesion tests, and thickness measurements, as-specified by AMS-QQ-C-320. In addition, steel parts shall be tested for hardness. If the hardness is greater than Rockwell C40, the parts are subject to hydrogen bakeout as described in section 6.0.

9.0 TRAINING AND CERTIFICATION OF PERSONNEL

This chromium plating process shall be performed by personnel qualified to conduct the process through training or experience. If this process is performed by an outside vendor, the development of an appropriate training program shall be the responsibility of the vendor.

10.0 DEFINITIONS

Electrodeposition	The electrodeposition process consists of putting a conductive material from a plating solution onto a substrate by the application of an electric current.
Substrate	The material, component, or workpiece to which the chromium plating is deposited. May also be called "base metal."